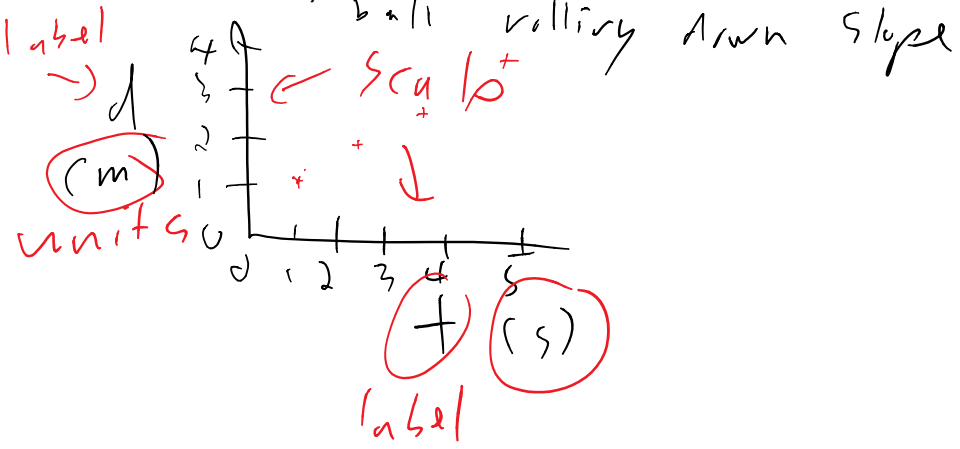
Graphing and pendulum lab
sig fig homework
non - linear graphing no
pendulum lab

1a) 6 b) 4 c) 2 d) 2
2a) 4.764 x 10^1 = 47.64 b) -2.040 c) 557 = 5.6 x10^2
d) 5 x 10^3 0.005 has 1 sig fig, so 24.1/0.005=4,820.0

3a) 708 even rule so if it was 708.5 you would also round it to 708

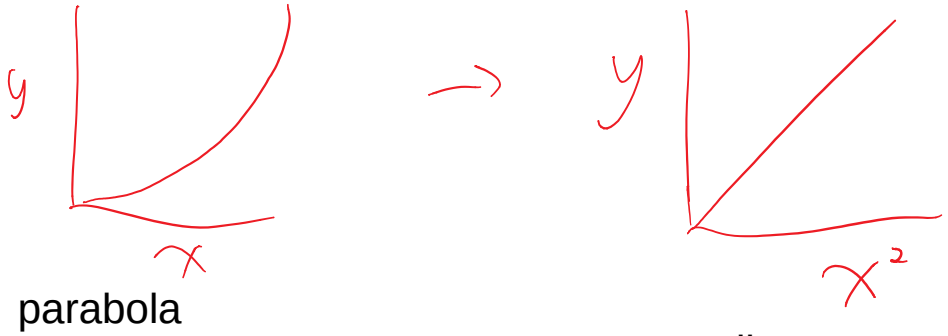
graphing

all graphs need:
title - don't just write d vs t, say ball rolling down slope
axes with labels, units and uniform scale



plot data points - sometimes use a plus to indicate uncertainty
draw a best - fit line - show the trend of the data
DO NOT CONNECT THE DOTS
if the dots are lined up, then use a ruler for the line and try to be close to all the data, doesn't have to go through the origin
then you draw a triangle using two points on the line as far apart as you can to determine the rise and run to get the slope, m = rise/run
don't forget units and round it to a reasonable number of sig figs (2 or 3 usually)

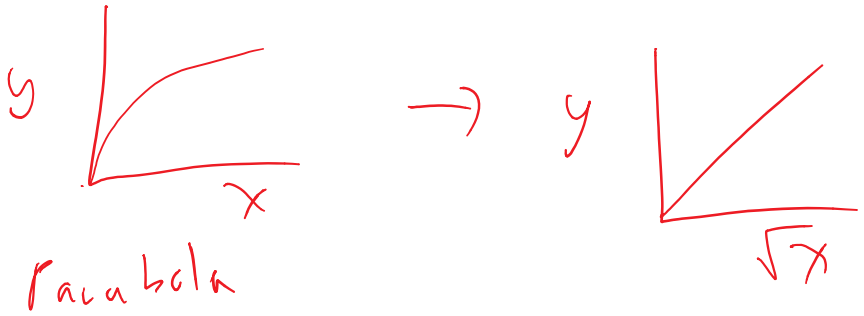
if the data is not linear, draw a smooth curve
- recognize the curve and transform the data to make it straight



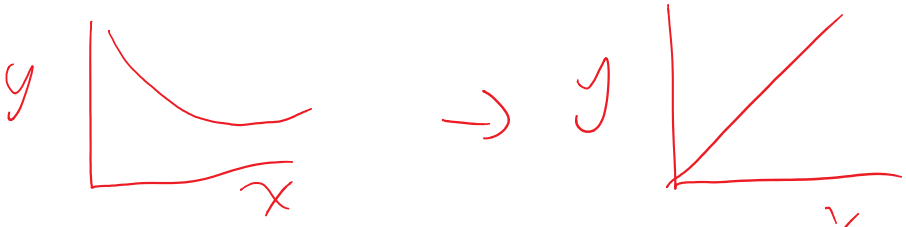
parabola

linear
proportional

$y \propto x^2$

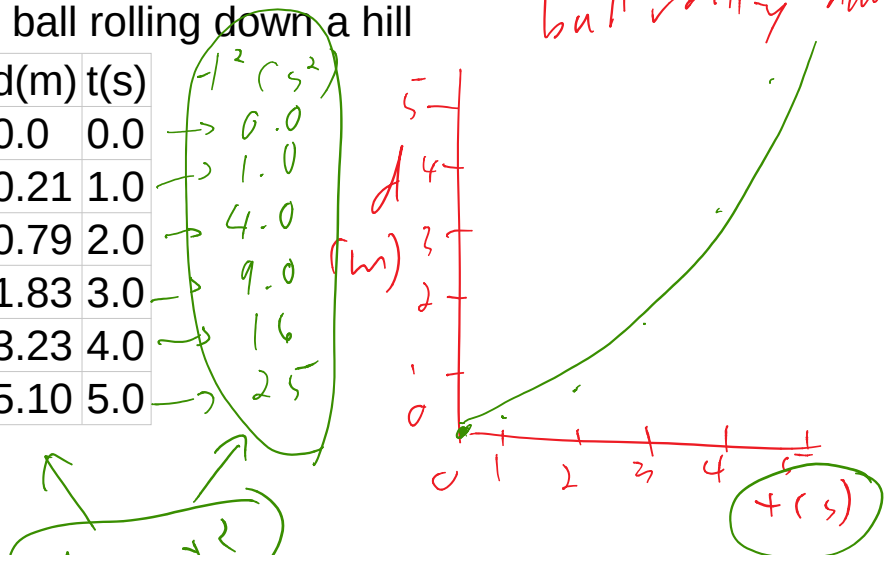


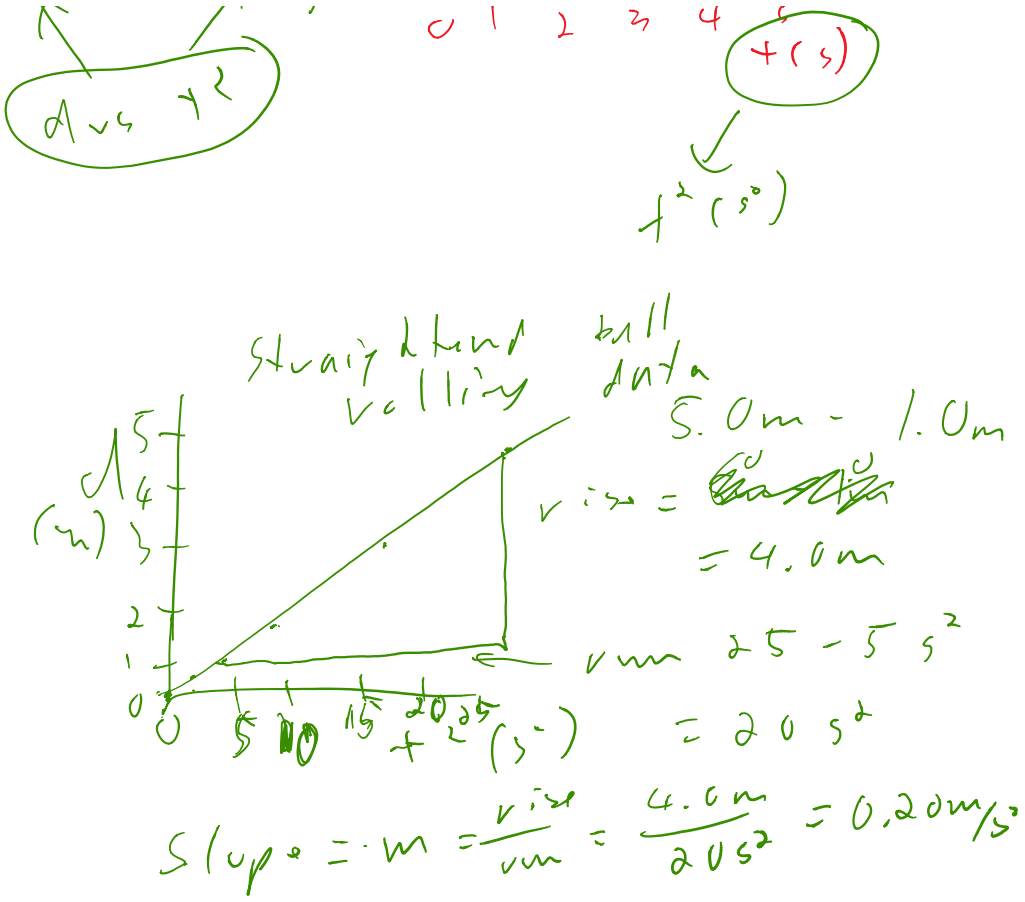
Parabola



hyperbola
inverse relationship
ball rolling down a hill

d(m)	t(s)
0.0	0.0
0.21	1.0
0.79	2.0
1.83	3.0
3.23	4.0
5.10	5.0





y- intercept = 0.1 m

equation:
y=mx + b
d= 0.20 m/s^2 t + 0.1m

* purpose

block 1-2
Sig fig worksheet
graphing non-linear functions
graphing practice - derive eqations

next class : lab period of a pendulum - graphing, lab report intro/practice
Friday quiz - units, sig figs, graphing 1-linear 1-nonlinear

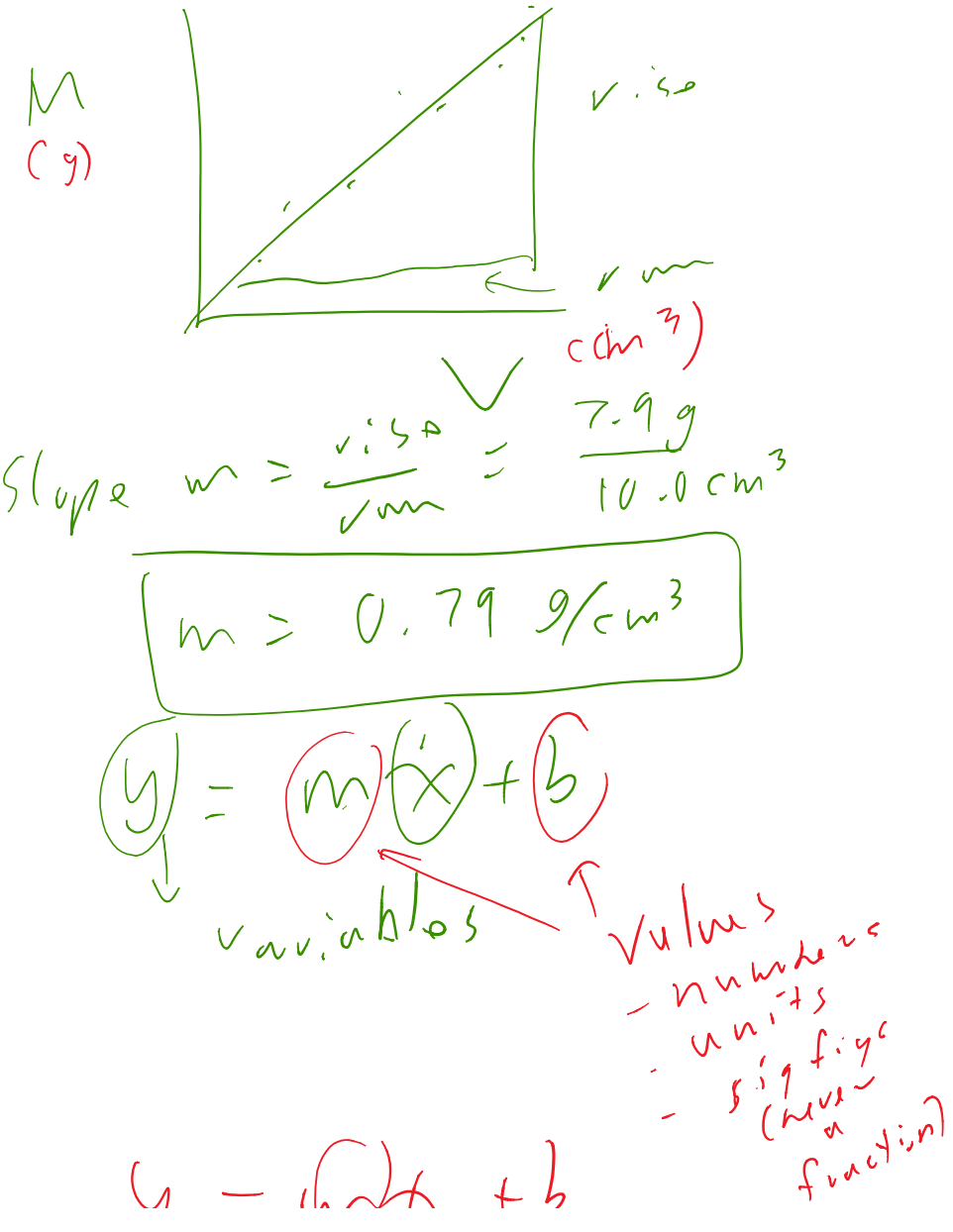
sig figs
1a) 6 b) 4 c) 2 d) 2

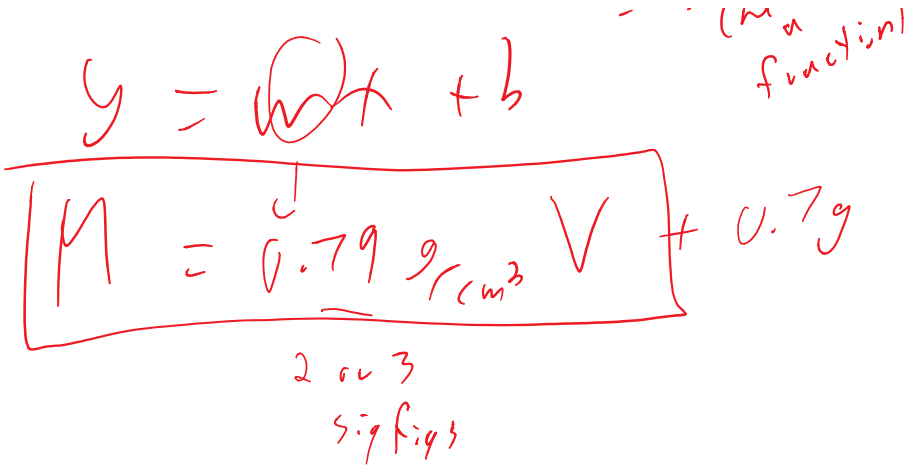
2a) 47.36 round to the hundredth - decimal place
b) -1.960 must have the zero to show the precision
c) 5.6×10^2 d) 5×10^3 watch 0.005 has only 1 sig fig, so the answer is rounded to 1 sig fig

3a) 707.5 rounds to 708 by the even rule
if it was 708.5 it would still round to 708
708.5000000000000001 round to 709
708.53 even rule does not apply unless it is exactly 5

17, 29

q17





independent variable goes on the x axis - the variable that you set.
eg. you pour a certain volume of liquid and measure the mass, the volume is the independent quantity - you set the value

dependent variable - on the y axis - the variable you measure but don't set
eg. the mass of the liquid you poured

convention - y vs x, so if I say "graph Mass vs Volume" I am implying Mass on the y axis and Volume on the x axis.

lose $0.29 per pizza
area = pi r^2

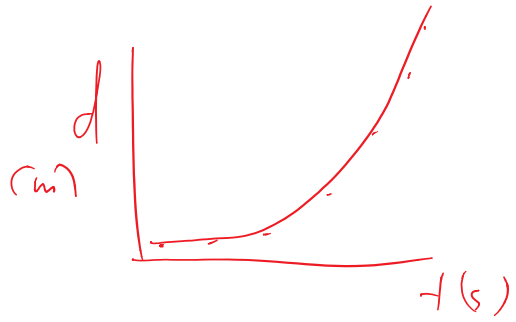
graphing

http://physics-pages.wikispaces.com/file/view/Graphing%20tips.pdf/560059391/Graphing%20tips.pdf

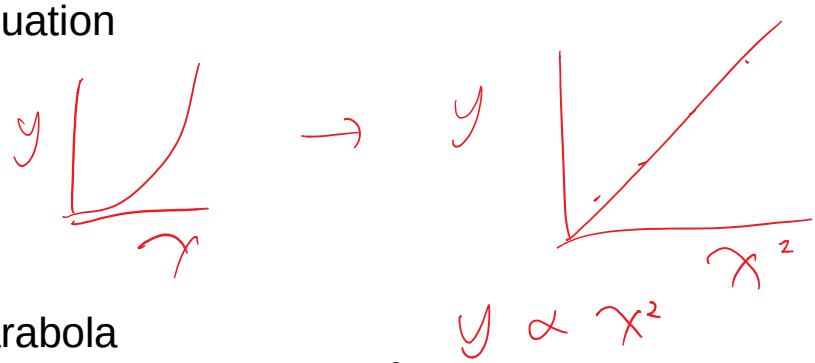
C = 3.1 D
V= 4.9 m/s^2 t + 0.1 m/s

What if the quantities are not linearly related?

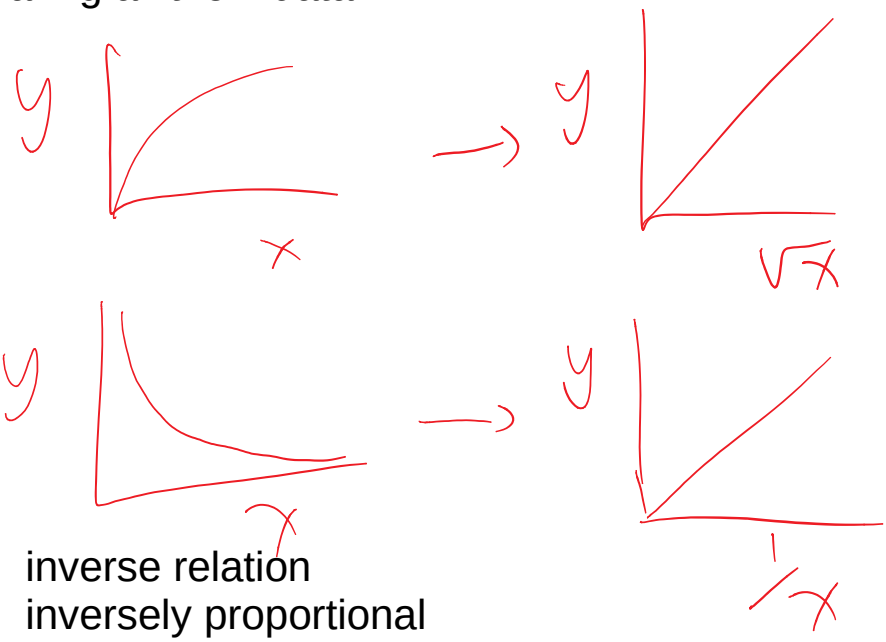
eg. a ball rolling down a slope:



transform the data to linearize and get the equation



parabola
so y is proportional to x^2, so you regraph the data by squaring all the x data



inverse relation
inversely proportional
Hyperbola

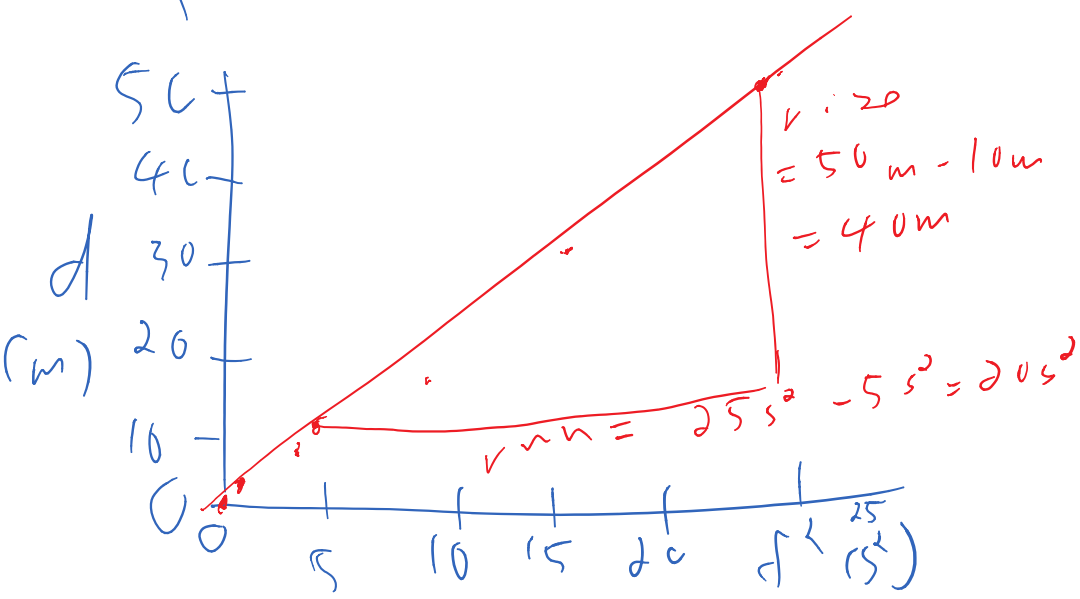
reciprocal
flip it

a ball rolling down a hill

eg. d(m)	t(s)
0.0	0.0
2.1	1.0
8.0	2.0
18.3	3.0

t^2 (s^2)
0
1.0
4.0
9.0

8.0	2.0
18.3	3.0
32.1	4.0
51.2	5.0



slope, m=rise/run = 40m/20s^2 = 2.0 m/s^2

y=mx + b'

d = 2.0 m/s^2 t^2 +1.0 m